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ABSTRACT

Physical aggression among institutionalized mentally retarded persons arouses great social concern. To examine the effectiveness of four-point mechanical restraints and a positive adaptive symbol program in the reduction of high frequency, high intensity aggression, three institutionalized severely mentally retarded adolescents (2 females, 1 male) participated in individually designed treatment programs. For each individual, targetsd behaviors were identified and recorded. Immediately following an incident of targeted aggression, the subjects were physically restrained in bed in a supine position for a specified period of time. Following restraint, the subjects participated in the symbol program, consisting of wearing a symbol reinforcer (e.g., hat, wristband), and verbal, social, edible, and tangible reinforcers. An analysis of the results showed that four-point mechanical restraint procedure when used in combination with the adaptive symbol program significantly reduced the frequency and intensity of physical aggression, with an average reduction in aggressive behavior of 83 percent reported amongst the three subjects. These findings suggest that contingent restraint can be a useful technique when used in combination with other procedures. (BL)

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DECREASING AGGRESSION USING FOUR-POINT RESTRAINTS AND SYMBOL PROGRAMS

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Decreasing Aggression Using Four-Point Restraints and Symbol Programs

Subject Index Term 19

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Abstract

Physical aggression among institutionalized mentally retarded persons arouses great social concern. Three adolescents each residing at a state facility for the retarded and exhibiting high frequency, high intensity aggression participated in individually designed treatment programs. Common to all three are the contingent use of four-point mechanical restraints for targeted incidents of physical aggression to people; and participation in a positive adaptive symbol program. Results indicate that a four-point mechanical restraint procedure when used with an adaptive symbol program can significantly reduce the frequency and intensity of physical aggression to others.

Physical aggression among institutionalized mentally retarded persons arouses great social concern. High frequency and high intensity aggressive behavior in an institutional setting often has the effect of disrupting social group functioning; causing physical harm to others, decreasing the likelihood that individuals involved in ongoing training programs will benefit from them; as well as interfering with the rights of others to participate in these programs.

Aggressive incidents among severely and profoundly mentally retarded individuals are due in part to impulsivity, excitibility or a lack of internal control. Such incidents can be more directly traced and appear to be more typically motivated by a need for attention (positive or negative); to escape task demands; as a learned maladaptive response to frustrating, ambiguous, or novel situations; in order to establish territoriality or hierarchical dominance with peers; as a counter control technique (for example, when requests are made by staff; and as a response to a monotonous environment. Recent research (Mulick and Schroeder, 1980) highlights the effects that environmental conditions and social organization seem to play in influencing the occurrence of aggression in institutionalized mentally retarded individuals. A comprehensive functional analysis of the antecedent conditions including environmental and social structures; individual differences; developmental variables; and the consequences of aggressive incidents appears to be crucial for effective behavior program implementation.

Behavioral techniques used to decelerate aggressive behaviors in the retarded typically involve the contingent application of a mildly aversive consequence immediately following the targeted response in combination with efforts to shape relevant appropriate behaviors by the use of positive reinforcers. Procedures reported most frequently in the literature include contingent withdrawal of positive reinforcement using locked time-out and unlocked quiet room procedures; selective ignoring; planned physical restraint (whereby the individual is held physically in a topographically safe yet mildly aversive posture); self-restraint; overcorrection; response cost; contingent exercise; aversive stimulation; contingent removal of personal property and/or privileges; and positive reinforcement of alternative appropriate behavior or training specific incompatible responses.

Another treatment strategy reported less frequently in the literature for use with aggressive retarded individuals is the use of mechanical restraint devices. These devices have been used primarily as a method of controlling and protecting self injurious persons. The restraint devices have been used in two primary ways: 1) applied continuously to SIB; and 2) applied contingent on SIB to contain and potentially decrease the behavior. The continuous application of mechanical restraints to prevent SIB is problematic although necessary in some cases. Such restraints may interfere with the individuals' participation in instructional programs; possible contribute to the demineralization and shortening of tendons; as well as decrease social interactions between subjects and their caretakers (Rojahn, Schroeder and Mulick, 1980). Three successful strategies for the systematic elimination of mechanical restraints have been reported in the literature. Favell, McGimsey, and Jones (1978)

reported a successful procedure involving the use of mechanical restraint devices as positive reinforcers making their application contingent upon increasing amounts of time with no SIB. Ward (1979) reported on a strategy involving the gradual reduction in the size of the restraint device until the subject was free of restraint. Hamad, Isley and Lowry (1983) report a third strategy for restraint elimination whereby treatment consisted of gradually increasing the amount of time out of restraint; providing a high density of reinforcement for not engaging in SIB while unrestrained; and using a brief duration time-out/physical hold procedure contingent upon the occurrence of SIB.

Strategies employing the use of contingent mechanical restraint for aggressive behaviors have not been as well delineated. Hamilton, Stephens and Allen (1967) reported the use of a time-out procedure involving a padded restraint chair for periods ranging from 30 minutes to 2 hours, with five individuals who engaged in self-injurious and aggressive behaviors. Contingent mechanical restraint can be viewed as a variation of time-out (Williams, Schroeder, Eckerman, and Rojahn, 1983) consisting of applying some device such as a camisole, headgear, or wrist cuffs. As these authors note it has the advantage of preventing behavior quickly and completely. In addition, contingent mechanical restraint also allows for positive practice for relaxation as in Webster and Azrin's (1973) required relaxation procedure, and in biofeedback procedures such as Schroeder, Peterson, Solomon, and Artley (1977).

Contingent physical restraint (manually holding the subject) appears less advantageous than the use of contingent mechanical restraint for several reasons. It is difficult for the staff member restraining the individual exhibiting the targeted behavior to remain neutral and exert just enough shadowing and physical control to prevent the undesireable behavior. In addition

the physical contact inherent in a physical restraint may have reinforcing qualities for the individual exhibiting maladaptive behavior and serve in some cases to exaccerbate the problem.

One disadvantage of time-out from positive reinforcement using a seclusion room addressed by Webster and Azrin (1973) is that it appears sometimes to elicit emotional behavior (i.e. tantrums) requiring extensions and longer durations of time-out. A secondary disadvantage is that time-out does not protect the individual against self injurious behavior which may in some cases be a negative emotional reaction to being placed in a time-out room. Webster and Azrin (1973) provide data in support of their required relaxation technique as an effective alternative to traditional time-out procedures. In their relaxation procedure, when a disruption occurs the individual is put to bed immediately in his/her night clothes and verbally prompted to relax. Each relaxation practice session lasted for 2 hours with the opportunity to extend the duration if the individual was not calm during the last 15 minutes. These investigators report a 95 percent reduction in disruptive behaviors including aggression, self injury, verbal abuse, tantrums, crying, screaming, cursing and threats. They also report that required relaxation practice was not accompanied by emotional behavior seen with time-out. In addition staff reported a positive attitude towards this technique. Required relaxation enjoys the basic advantage of contingent time-out in that it provides an interruption of both the disruptions and any other concurrent activities; seems to set limits; and functions as a period of time-out from positive reinforcement. In addition it provides for cues to relax (i.e. the conditioned connotation of quietude from being in bed in one's night clothes), and provides for removal of the individual from the situation in which the agitated disruption occurred.

Despite the strong indications of its value, as the authors point out, it is relatively ineffective for individuals who will not go to bed.

Four-point mechanical restraint training in one's bedroom and bed fosters relaxation by requiring the disruptor to lie in a position in a setting conducive to quietude. These cues to relax are in sharp contrast to the acticedent cues which occasion the aggressive behavior on the individual's living unit. The purpose of this study is fourfold: 1) to provide data to support the use of contingent four-point mechanical restraints to decrease physically aggressive behaviors; 2) to provide data to support the use of positive adaptive symbol programs as aids in shaping pro-social behaviors by promoting involvement in productive activities and setting the context for the individual to receive positive reinforcement and positive feedback; 3) to provide guidelines for the safe and constructive use of a four-point mechanical restraint procedure; and 4) to clearly deliniate an effective strategy for the use of contingently applied mechanical restraints in reducing physically aggressive behaviors.

Method

Participants and Setting:

Three adolescents each residing at a regional state facility for the mentally retarded and exhibiting high frequency, high intensity physical aggression participated: 1) a 19-year old, severely retarded female; 2) an 18-year old, severely retarded female; and 3) a 19-year old, profoundly retarded male.

Subject 1

Subject 1 is a 19-year old female functioning in the severe range of mental retardation. She has a history of extreme physical aggression to people and other maladaptive behavior stemming from early childhood. At age 6 she was institutionalized because she was too difficult to manage at home. She is able to use signs, gestures and short phrases to indicate her needs and wishes. Planned physical restraint procedures (i.e. until calm for 1 minute; until calm for 2 minutes) and time-out procedures of varying intervals (i.e. until calm for 10 minutes; 10 minutes plus 1 minute calm; 15 minutes; 30 minutes) have not proven effective. Per month frequencies of targeted incidents of physical aggression remained in the 80 to 250 range. Positive reinforcers delivered using different schedules of presentation in combination with these procedures have not proved to be effective. Differential reinforcers of other behaviors (DRO), differential reinforcement of specific incompatible behaviors (DRI) and environmental manipulation techniques also failed to produce sustained decrements in targeted behaviors. Other techniques used in the past which failed to produce any significant deceleration in response frequency include contingent withdrawal of attention, play

therapy, deep breathing and instructed relaxation; behavioral counseling and redirecting to play activities.

Mickey Mouse toys and accessories have proven to be the most significant motivators over time. A functional analysis indicates that antecedents to her behavior appear mostly to be to gain staff attention. At times there appears to be an exhibitionistic element to her behavior (i.e. to out do her peers). Precursor behaviors to physical aggression tantrums may include spitting on staff, waving her fist in a threatening manner, banging on her chest with her fist, and flopping to the floor. She may become easily upset and aggressive at times even when staff attempt to deliver positives (social, verbal, and edible). Aggressive episodes are typically accompanied by a great deal of anger and rage. She is subject to rapid mood swings within relatively short periods of time.

Recently a water mist program in conjunction with a quiet room and the opportunity to earn Mickey Mouse puzzle pieces was implemented to no avail. Figure 1 (Baseline MO 1, MO 2) shows the monthly frequencies for the water mist procedure with a frequency of 176 targeted incidents. During month 1 of water misting the response frequency increased from 176 to 215 incidents. During month 2 of water misting the frequency continued to accelerate to 256 incidents (see Figure 1). As a result of this upsurge in aggressive incidents the decision was made to move to a more aversive consequence, specifically, use of a diluted tabasco mist (12 parts water to 1 part tabasco mixed by the Center pharmacist) administered in 3 consecutive mists per incident of targeted physical aggression. Baseline MO 3 (see Figure 1) indicates that this procedure reduced the response frequency by approximately 50% from the preceding month (Baseline MO 2). Due to the intrusive nature of this procedure a 50%

(approximate) reduction in the response frequency after it had accelerated from use of the water mist was not sufficient to warrant continuation.

The decision was made to move to the four-point mechanical restraint in order to gain greater control over her behavior. The objectives for using this procedure were to: 1) provide for a period of required relaxation; 2) to ensure the safety of this resident, staff, and other residents by preventing further harmful behavior quickly and completely; 3) to temporarily remove the individual from a reinforcing environment contingent upon her behavior; 4) to break the behavioral chain of antecedent events preceding aggressive tantrums; 5) to provide for a period of reduced environmental stimulation; 6) to help her to learn to exert greater control over her behavior by providing discriminative cues; and to 7) to lead to sustained decrements in both the intensity and frequency of targeted maladaptive behaviors.

Targeted Behaviors:

For Subject 1 the following behaviors were targeted for purposes of the Posey four-point restraint training: hitting, biting, scratching, kicking, shoving people violently, throwing objects forcefully at people, throwing over furniture, willfully breaking property, and banging on windows following 2 verbal prompts to stop spaced by 3 seconds between prompts.

Observation and Recording:

Unit staff recorded all incidents of targeted behavior on the Behavior Program Record, a data sheet, which includes: specific behavior(s) exhibited, date, time mechanical restraint was started and time ended, duration, antecedent(s), consequence(s), and staff member(s) involved. Contingencies were in effect 7 days a week during the resident's waking hours.

Reliability:

Randomized checks were made by the psychologist on a regular basis to determine degree of concurrence with staff's judgement regarding operationalization of targeted behaviors.

Evaluation of the Data:

Four measures were evaluated by the psychologist in determining programmatic sucess: 1) frequency of the targeted behaviors; 2) intensity of the targeted behaviors; 3) percentage of activities attended as per her daily activity schedule; and 4) the amount of time spent wearing her Mickey Mouse ears (symbol reinforcer).

Approvals:

Prior written approval and review was required for each participant from the respective interdisciplinary team, unit psychologist, physician, parent, an internal review committee (Behavior Modification Committee), local human rights committee, and the Director. A State appointed advocate working in the institution was also notified in advance and reviewed the procedures. The physical therapist assisted in assuring appropriate design, fit and application of the restraint devices.

Equipment:

Four-Point Mechanical Restraint- Posey plastic wrist cuffs (plastic unlined keylock wrist cuffs, 2701). Posey replacement connecting straps (cotton with keylock buckle 2320). Canvas lamb's wool lined leg straps developed by the Center's physical therapist. The plastic cuffs and leg straps are secured to the metal bed frame.

Symbol Program:

A Mickey Mouse head cap with plastic ears, and a Mickey Mouse emblem on the front purchased at Toy's R Us.

Safeguards:

The following safeguards were followed strictly by staff implementing the mechanical restraint procedure for each participant.

1) Participants were restrained in their bed in a supine position to avoid breathing or choking problems.

2) Staff observed outside the door (left ajar for viewing) constantly during the restraint interval. Staff entered the room and physically checked the resident and equipment every 15 minutes to determine any health or safety problems for the 60 and 90 minute restraint intervals. For the 50 minute restraint interval checks were made during the first and second 10 minute intervals. All checks were recorded on the Behavior Program Record to assure accountibility.

3) Each participant is allowed a 10 minute bathroom break after each restraint interval. Even if the participant becomes physically aggressive they are not re-retrained during the 10 minute period or thereafter for aggressive incidents which occur during this period.

4) If the participant is restrained during scheduled mealtimes their meal is brought back to the unit from the cafeteria for them.

5) Each participant is given a minimum of 20 minutes to eat their meal should they be in the process of eating between restraint intervals.

6) Should any participant urinate or deficate while in the mechanical restraints, staff will immediately remove the affected clothing and sheets; clean the area and drape a clean sheet securely over them.

7) Each staff member was trained personally in advance of their implementation of these procedures by the unit manager (team leader) and unit shift supervisiors who were personnaly trained by the psychologist in the proper use of the equipment, required safeguards, identification of targeted behaviors, and record keeping.

Procedure:

Immediately following each incident of targeted aggression the subject is physically escorted to her bedroom and placed in the four-point mechanical restraint in her bed in a supine position. Typically 3 trained staff members are needed to implement this procedure safely and expeditiously. During the first 2 months of the treatment phase (see Figure 1) she was restrained for 90 consecutive minutes per incident. Medicaid regulations required reducing the interval to 60 consecutive minutes per incident. During months 3 thru 10 (see Figure 1) she was restrained using the 60 minute interval. Following month 10 the decision was made by the psychologist in conjunction with the interdisciplinary team to reduce the restraint interval to 50 minutes per incident. This decision was based on a sustained reduction in monthly frequencies of aggression (MO 6 - MO 10), reduced intensity of the aggressive incidents and positive adaptation to her symbol program. During months 11 thru 24 (see Figure 1) she was restrained for 50 minutes per incident of targeted physical aggression.

Throughout the period of time in which she received four-point mechanical restraint programming she participated in her positive adaptive symbol program (Mickey Mouse Ears). She is given the opportunity to wear her Mickey Mouse ears each morning as a symbol reinforcer. When wearing her "Ears" she is given verbal, social, edible, and tangible positive reinforcers (i.e. Mickey Mouse puzzles and telephone set) as appropriate in the context of her daily activity schedule. She loses her "Ears" for the duration of the mechanical restraint interval. She has the opportunity again to wear them following each restraint.

Subject 2

Subject (2) is an 18-year old Down's syndrome female functioning intellectually at the high end of the severe range of mental retardation. She has a history of physical acting out behavior since early childhood. Her parents placed her in the institution where she currently resides at age 15 when she became totally unmanageable in the home and community schools. She indicates her needs and wants verbally utilizing short phrases and sentences. Observations have indicated that she has tended to target certain individuals, typically those who cannot/do not defend themselves and also who give a great deal of feedback as a result of the aggression (i.e. they scream, yell, fall, etc.). As such, the aggression to residents appears to have more oparant (environmental) factors maintaining it.

Time-out from positive reinforcement was tried systematically at different intervals (i.e. 15 minutes plus 2 minutes calm; 12 minutes plus 2 minutes calm) with initial reduction in response frequency noted but no sustained decrements over time. Planned physical restraints (i.e. until calm for 2 minutes; and 10 minutes plus 1 minute calm) showed some initial success but some lost effectiveness (i.e. monthly data frequences plateaued, intensity remained high). A corner program at school for 5 minutes plus 5 seconds calm for targeted incidents of physical aggression met a similiar fate. Environmental manipulation and a variety of identified positive reinforcers delivered using fixed interval and intermittent schedules were used in combination with these procedures to increase their potency. A functional analysis indicates that inappropriate laughter and stalking targeted individuals at times were reliable precursors to intense episodes of aggression. Attempts were made to re-direct her to play activities targeting these antecedents. Despite the consistent implementation

of these behavioral techniques her aggression escalated in intensity causing several relatively serious injuries to other residents.

As a result a four tiered behavior program was tried moving in an experimental clinical trails design from Phase I: 1 mist of cool water per incident of targeted physical aggression; to Phase II: 3 consecutive mists of cool water per incident; to Phase III: 1 mist of diluted tabasco solution per incident; to Phase IV: 3 consecutive mists of diluted tabasco solution per incident. In conjunction with the four phrases of aversive conditioning an adaptive comprehensive token economy was in place with tokens being earned for task completion, compliance to specific staff requests, not exhibiting targeted behaviors, and exhibition of pro-social behaviors (i.e. interacting appropriately with peers). This program had the direct effect of helping to keep her occupied in productive activities and an indirect effect of having positive events surrounding her in the presence of peers. Rewards that she could purchase with her tokens included, caffeine free diet sodas, one to one staff attention, the opportunity to listen to songs of her choice (i.e. Candy Man), and extra changes of clothing.

Figure 2 (Baseline MO 1, MO 2, MO 3) shows monthly frequency data for 3 months of Phase IV training (3 consecutive mists of diluted tabasco solution per incident of targeted physical aggression). During baseline MO 2 the data decelerates significantly. Even more significant is the rapid and pronounced acceleration of the monthly frequency during MO 3 suggesting an exaccerbating effect of the treatment. As a result of this exaccerbation the decision was made to move to the four-point mechanical restraint training for 60 consecutive minutes per incident of targeted physical aggression. The rationale was similiar to that described for Subject 1 (see page 6). The token economy was

retained since data indicated a rise in the mean number of tokens earned per day indicating gains in the shaping of pro-social behaviors (i.e. compliance to specific staff requests) despite the upsurge in aggressive incidents.

Targeted Behaviors:

For Subject 2 the following behaviors were targeted for purposes of the Posey four-point restraint training: hitting, scratching, kicking, pinching, biting, pulling hair, forcefully pushing others, forcefully jumping on people not in a play situation, and forcefully throwing objects at others.

Observations and Recording:

(Same as Subject 1, see page 8)

Reliability:

(Same as Subject 1, see page 9)

Evaluation of the Data:

(Measures 1-3 are the same as Subject 1, see page 9) Measure 4 for Subject 2 is the average number of tokens earned per day.

Approvals:

(Same as Subject 1, see page 9)

Equipment:

Four-point mechanical restraint (same as Subject 1) Symbol Program: large plastic poker chips.

Safeguards:

(Same as Subject 1, see page 10)

Procedure:

Immediately following each incident of targeted aggression on or near the unit, the subject is physically escorted to her bedroom and placed in the four-

point mechanical restraint in a bed in a supine position. During the first 21 months of the treatment phase (see Figure 2, Treatment Phase MO 1- MO 21) she was restrained for 60 consecutive minutes per incident. Beginning with MO 22 (see Figure 2) the restraint interval was reduced to 50 consecutive minutes per incident due to the sustained deceleration in the monthly response frequency.

Immediately following incidents of targeted aggression away from the unit the subject was physically restrained (manually held) in a prone position until calm for 3 minutes. Staff felt that this resident could not be escorted back to the unit safely for four-point mechanical restraint training. The subject had the opportunity to earn 1 token every 30 minutes for exhibiting generally pro-social behavior (i.e. no incidents of aggression). In addition opportunities are presented throughout the day and evening to earn additional tokens for compliance and task completion (i.e. making her bed, exercising). Reward items are reasonably priced and she can trade her tokens in if she chooses when she has earned a sufficient amount to make a purchase.

In addition, this resident makes restitution and extended restitution for incidents of inappropriate urination, defecation and smearing. Restitution consists of her being required to clean the affected areas. She makes extended restitution by cleaning her clothes with staff assistance. She wears a robe while her clothes are being cleaned and is given only one set of clothing per day which is re-cycled. Each morning she is given a choice of clothing to wear. She is given tokens for appropriate toileting as well as social rewards on an ongoing response contingent basis for appropriate toileting. The hypothesized causes of the deliberate urination, defecation and smearing is to

gain negative attention and a clothes change. She is toilet trained and has been examined for any medical considerations. Finally, this resident is sent to the quiet room until calm for 2 minutes for incidents of forcefully, repeatedly banging on glass windows or doors.

Subject 3

Subject (3) is a 19-year old, profoundly retarded male who has been institutionalized since age 5. His parents felt that they could no longer care for him at home due to "hyperactive" behaviors. He appears suspicious of the motives of others; is tactilely defensive and has been described as a loner. He has not developed functional speech and communicates mostly using signs and gestures. This resident has a long standing history of rebellious, oppositional, and high intensity physical aggression to people. Systematic desensitization and positive practice training have been used to impact on his defensiveness and help him approach others in an appropriate manner. Time out from positive reinforcement and planned physical restraint employing different restraint typographies and interval durations (i.e. 15 minutes plus 15 seconds calm; 10 minutes plus 15 seconds calm; 5 minutes plus 15 seconds calm) have been tried over a period of years. A wide variety of identified positive reinforcers have been used in high density and delivered using various reinforcement schedules. These restrictive and reinforcement techniques in combination have had the general effect of keeping the frequency of his aggression within limits. However, as he has matured the intensity of his aggression has heightened resulting in numerous serious staff and resident injuries. The frequency of his aggression has also accelerated.

A functional analysis indicates that at times his behavior appears to

be defensive in nature (i.e. a misperception of people's intentions requiring retaliation). At other times it appears to be a response to a resident bothering him (i.e. invading his personal space) or in chain reaction to another resident being upset. A loud noise may also serve as a possible antecedent.

Figure 3 (Baseline, MO 1, MO 2, MO 3) indicates monthly frequencies of behavior programming using a quiet room until calm for 10 minutes per incident of targeted physical aggression. In addition, during this 3 month period the subject was physically restrained until calm for 5 minutes for incidents of targeted physical aggression while in transit, off the unit. During this baseline period this resident's physical aggression (see Figure 3) remained at an unexceptably high level during this period with high intensity resulting in numerous serious staff and resident injuries. Therefore, the decision was made to move to four-point mechanical restraint training using a similiar rationale as for Subjects 1 and 2. In addition, a positive adaptive "wrist-band program" begun during the baseline phase was retained since it appeared to be highly reinforcing to the resident and contributed to increases in pro-social behaviors despite increases in high intensity aggressive episodes.

Targeted Behaviors:

For Subject 3 the following behaviors were targeted for purposes of the Posey four-point restraint training: kicking, biting, hitting, slapping, pinching, pulling others'eye glasses off, pulling hair, pushing or shoving violently, throwing objects forcefully at people, and forcefully stomping on others' toes and feet.

Observation and Recording:

(Same as Subjects 1 and 2, see page 8)

Reliability:

(Same as Subjects 1 and 2, see page 9)

Evaluation of the Data:

(Measures 1-3 are the same as Subjects 1 and 2, see page 9). Measure 4 for Subject 3 is the amount of time wearing his wristband symbol reinforcers.

Approvals:

(Same as Subjects 1 and 2, see page 9)

Equipment:

Four-point mechanical restraint (same as Subjects 1 and 2). Symbol Program: athletic type "sweat" wrist bands.

Safeguards:

(Same as Subjects 1 and 2, see page 10)

Procedure:

Immediately following each incident of targeted aggression on the unit, the subject is physically escorted to his bedroom and placed in the four-point mechanical restraint in his bed in a supine position for 60 consecutive minutes (see Figure 3, Treatment Phase MO 1- MO 10). Off the unit, in transit the subject is physically restrained in a prone position for 10 minutes plus 2 minutes calm for targeted incidents of physical aggression. Each morning he is given the opportunity to wear his wristbands. He only loses them during periods he is restrained either mechanically or physically. The are returned to him after he is calm following the restraint interval.

Results

Mean comparison's were made for each of the three cases. The average frequency of the last 3 months of consequated incidents of aggression using the mechanical restraints was compared to the average frequency of the three months prior to the training (Baseline). Subject 1 was programmed prior using water and subsequently deluted tabasco misting with an average monthly frequency of 194 incidents as compared to an average monthly of 41 for the past 3 months (see Figure 1). This data indicates a 78% decrement in the targeted behaviors with mechanical restraint/symbol program training. Figure 1 does indicate subsequent rises in the monthly frequencies with each reduction in the restraint interval (i.e. from 90 minutes to 60 minutes; from 60 minutes to 50 minutes). Following each of these peaks in the data, there is a subsequent reduction and leveling off. During these periods in which the data indicates reductive/leveling off trends staff report and observations/data indicate reduced intensity in aggressive episodes; increases in the percentage of activities attended as per her daily activity schedule; and increased amount of time spent wearing her Mickey Mouse ears (symbol reinforcer). In addition there appears to be correlative decreases in precursor behaviors, specifically, pounding her chest, spitting on staff, gestural threats such as fist waving, and flopping on the floor.

Subject 2 was programmed prior using increasing amounts of diluted tabasco misting with an average monthly frequency of 111 incidents as compared to an average frequency of 11 for the past 3 months (see Figure 2) indicating a 90% decrement in the targeted behaviors. Figure 2 indicates

that we were able to successfully reduce the mechanical restraint interval following MO 21 (Treatment Phase) from 60 to 50 minutes with only a rise of 1 incident during the subsequent month (MO 22, Treatment Phase). A trend analysis indicates a more consistent reductive pattern in the monthly frequencies with this resident than with Subject 1. Reductions were also seen in the intensity of the aggressive incidents (as measured by number of incident reports resulting from her aggression which required medical treatment). The average number of tokens earned per month as a ratio of tokens earned to number of opportunities to earn tokens did not increase but remained steady. Percentage of activities attended as per her daily activity schedule did increase. There were correlative decrements in the frequency of aggressive incidents off the unit. In addition, correlative decrements were seen in the response frequencies of inappropriate urination, inappropriate defecation, and repetitive banging on windows and doors. Her father reports significantly improved behavior on her past on home visits, a clear sign of generalization of the mechanical restraint training on the unit.

Subject 3 was programmed prior using contingent removal to a quiet room until calm for 10 minutes with an average monthly frequency of 63 incidents as compared to an average monthly frequency of 10 for the past 3 months (see Figure 3) indicating an 84% decrement in the targeted behaviors. The targeted behaviors decelerate rapidly during Treatment Phase MO 1; a resurgence is seen during Treatment Phase MO 2; and a generally rapid decelerating trend is seen thereafter (see Figure 3, Treatment Phase MO 3- MO 10). Correlative decreases were also seen in the monthly frequency of planned physical restraints until calm for 5 minutes for targeted incidents of ag-

gression of the unit. Data for the last three months is as follows: 20x; 11x; 7x. This resident has made significant gains in the percentage of activities attended as per his daily activity schedule. He has shown greater adaptation to his wrist band (symbol program) and wears it for longer periods to time. In addition, his mother reports a generalized effect of the mechanical restraint training conducted on the unit, specifically, markedly improved behavior on home visits.

Discussion

Results indicate that a four-point mechanical restraint procedure when used with an adaptive symbol program can significantly reduce the frequency and intensity of physical aggression to others. This combination training approach may also lead to an increase in pro-social behavior and a greater percentage of activities attended. As a response consequence, the mechanical restraint functions as an analogue to time out from positive reinforcement; provides for a period of required relaxation; and may prove to be more effective than aversive conditioning (i.e. water and diluted tabasco misting; or removal to an unlocked quiet room). Mechanical restraint training has the added advantage of protecting the individual against self injurious behavior provided that the safeguards outlined here (see page) are carefully adhered to.

In general, the results of the three case studies provided support the contention of Williams, Schroeder, Eckerman and Rajahn (1983, pg. 205) that "contingent restraint can be a very useful technique, especially when

used in combination with other procedures, because it can be performed quickly, briefly, and with a minimum interruption of ongoing activities." The possible disadvantages of contingent restraint listed by these authors (Williams et al, 1983), specifically: a) that contingent restraint may increase inappropriate behavior; b) sometimes results in dependency leading to restraints becoming reinforcing; c) that release from restraint may be an occasion for high-rate inappropriate behavior; and d) that the use of mechanical restraint may reinforce staff and peers for removing the subject from interaction do not appear to have been supported by the data from any of the three cases or by direct systematic observations.

The eventual goal in all three of the cases presented is to further decrease the mechanical restraint intervals and eventually fad them altogether. An additional desired outcome is to make further gains in shaping pro-social behaviors; provide for greater increases in the percentage of meaningful activities attended; and provide for greater positive feedback from staff and peers thus enhancing the supportive aspects of each residents environment. Behavior programming with these techniques is not short term in nature with clients having long standing seemingly intractible problems with physical aggression. Sustained significant decrements in targeted response frequency may take 10 to 24 months to achieve.

One limitation of this study is the lack of a validated measure of required relaxation which is also absent in the work of Webster and Azrin, 1973. Further research should include such a measure. Possibilities exist for measuring the activity of the subject while restrained in bed by the use of transducers or simple micro-switches which would activate some measure of

electrical current change which would translate into some fractional blip on a chart giving a frequency measure of movement on the bed. Presumably less activity would represent greater relaxation.

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Figure 1

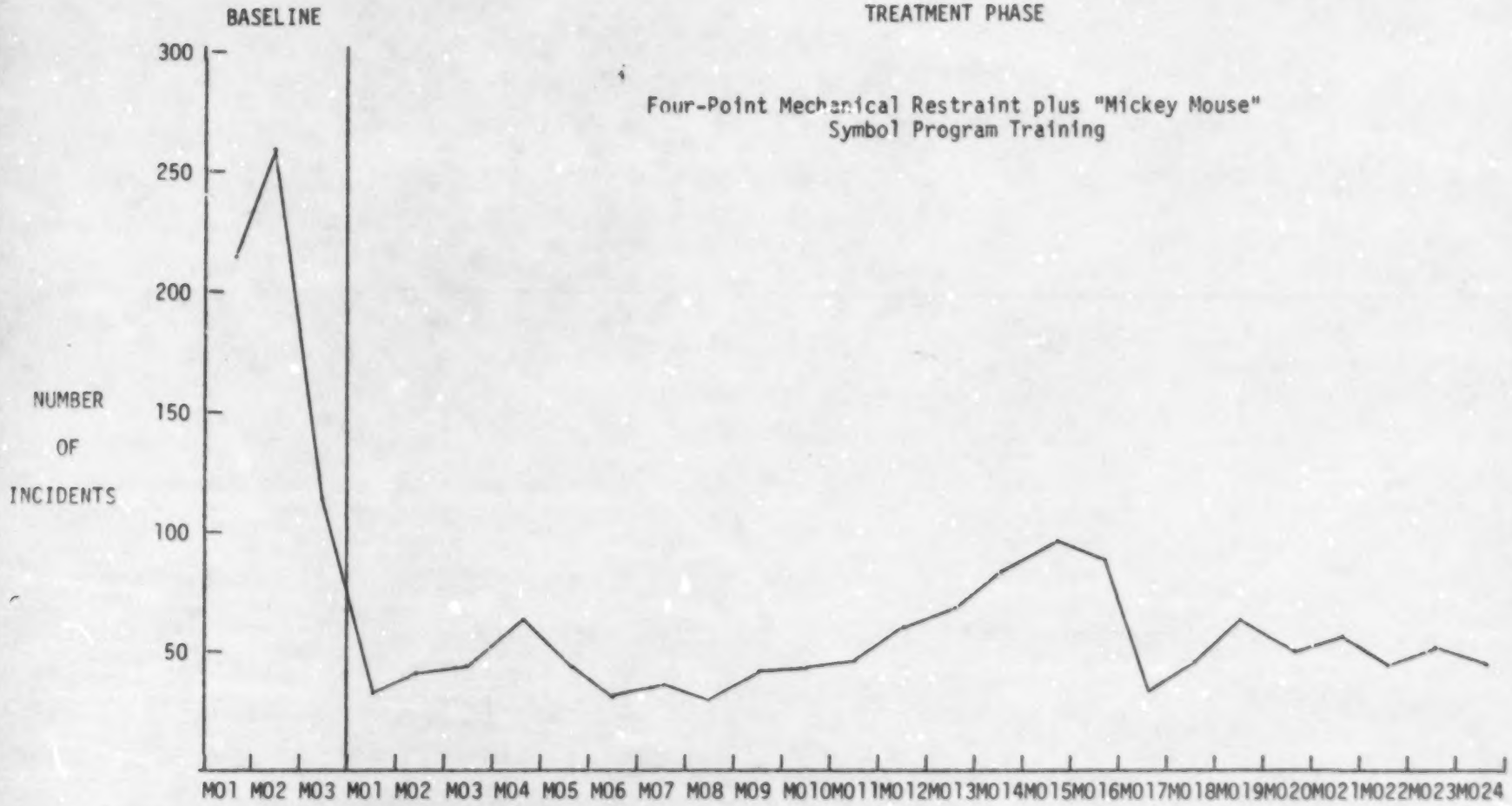
BASELINE
TREATMENT PHASE
Four-Point Mechanical Restraint plus "Mickey Mouse"
Symbol Program Training
NUMBER
OF
INCIDENTS
300
250
200
150
100
50
M01 M02 M03 M01 M02 M03 M04 M05 M06 M07 M08 M09 M010M011M012M013M014M015M016M017M018M019M020M021M022M023M024

Figure 2

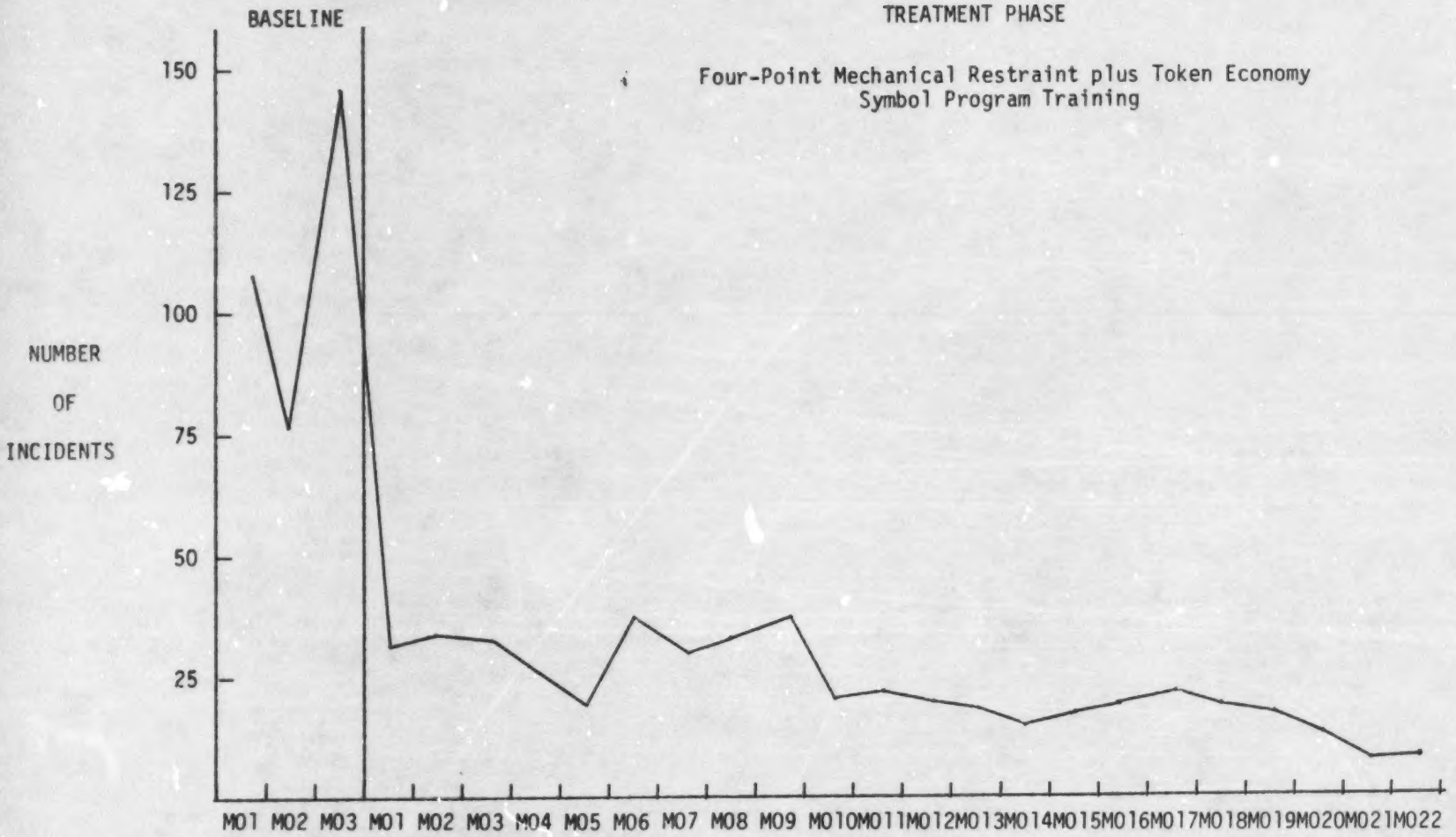
BASELINE
TREATMENT PHASE
Four-Point Mechanical Restraint plus Token Economy
Symbol Program Training
NUMBER
OF
INCIDENTS
150
125
100
75
50
25
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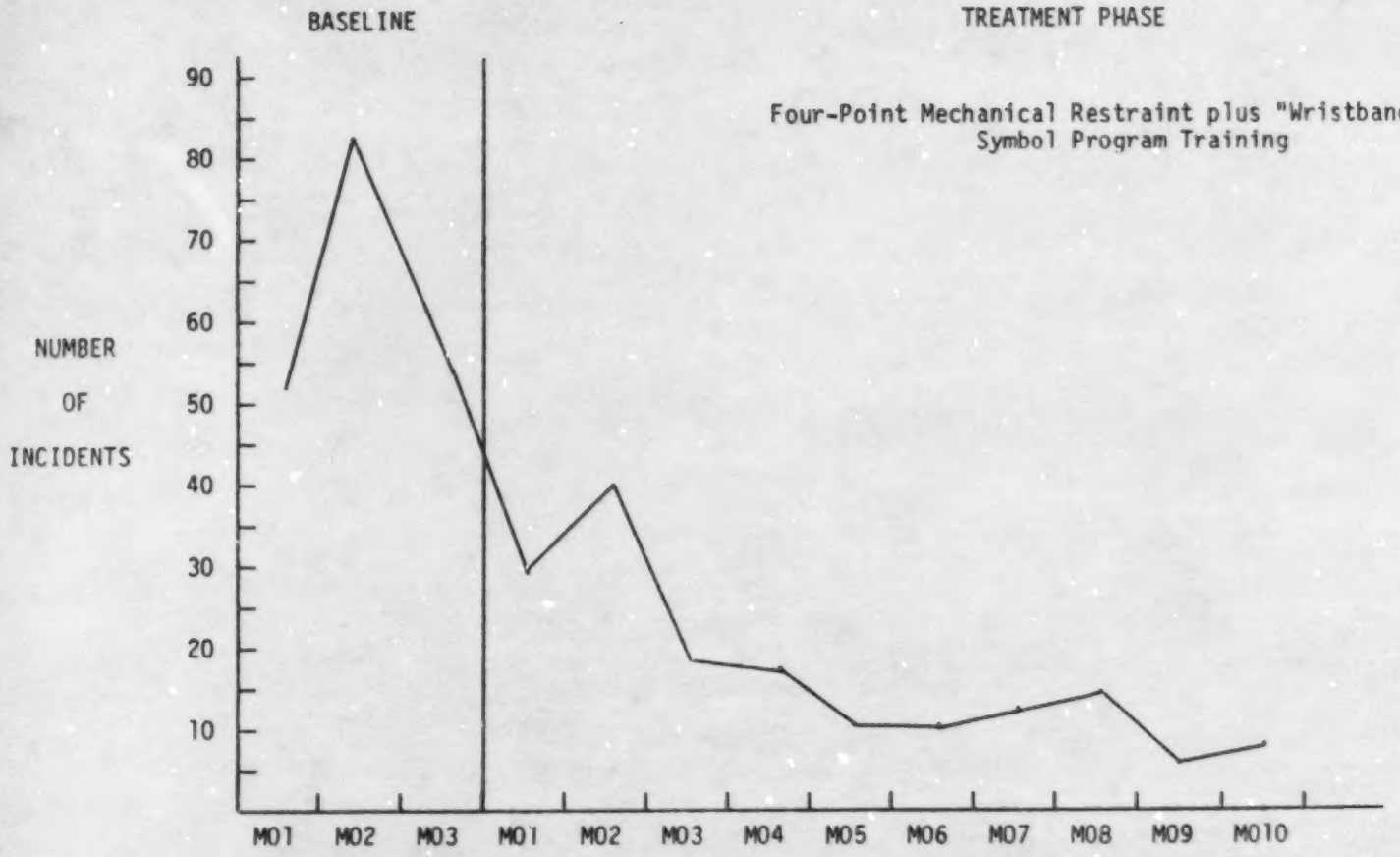
Figure 3


BASELINE
TREATMENT PHASE
Four-Point Mechanical Restraint plus "Wristband" Symbol Program Training
NUMBER OF INCIDENTS
90
80
70
60
50
40
30
20
10
M01
M02
M03
M01
M02
M03
M04
M05
M06
M07
M08
M09
M010